Appl. No.: 10/720,662
Amdt. dated 09/27/2005
Reply to Office action of 06/27/2005

Amendments to the Claims:

1. (Withdrawn) A modified pre-S of hepatitis B virus (HBV) which is either not glycosylated or is partially glycosylated.

2. (Withdrawn) The modified pre-S of HBV according to claim 1, wherein the modified pre-S is a mutant pre-S in which one or both asparagines of a wild-type pre-S at amino acid position 15 or 123 are substituted by any amino acid selected from the group consisting of alanine, arginine, cysteine, glutamine, glutamic acid, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, and valine.

3. (Withdrawn) The modified pre-S of HBV according to 2, wherein the wild-type pre-S is from an HBV selected from the group consisting of adr, ayw, adw, adw2, and adyw subtypes.

4. (Withdrawn) The modified pre-S of HBV according to claim 1, wherein the modified pre-S is selected from the group consisting of Pre-S-15m (SEQ ID NO:9), Pre-S-123m (SEQ ID NO:10), and Pre-S-dm (SEQ ID NO:11).

5. (Withdrawn) The modified pre-S of HBV according to claim 1, wherein the modified pre-S is a pre-S generated by treating a wild-type pre-S or a recombinant pre-S with glycosidase.

6 – 8 (Canceled)

9. (Currently amended) A recombinant pIL20-pre-S vector capable of expression of pre-S without linkage to S protein, wherein a nucleic acid sequence of the pre-S codes for a mutant pre-S in which one or both asparagines of a wild-type pre-S at amino acid position 15 ~~or~~ and 123 are replaced with any amino acid selected from the group consisting of alanine, arginine, cysteine, glutamine, glutamic acid, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, and valine.

10. (Previously presented) The recombinant vector according to claim 9, wherein a coding sequence of the mutant pre-S gene is selected from the group consisting of pre-S-15m (SEQ ID NO:9), pre-S-123m (SEQ ID NO:10), and pre-S-dm (SEQ ID NO:11).

11. (Previously presented) The recombinant vector according to claim 9, wherein the pIL20-pre-S is selected from the group consisting of pIL20-pre-S(m15), pIL20-pre-S(123m), and pIL20-pre-S(dm).

12. (Previously presented) The recombinant vector according to claim 9, wherein the recombinant vector is transformed into *Sacchromyces cereviciae* for producing the mutant pre-S.

13. (Withdrawn) The recombinant vector according to claim 9, wherein the vector is pIL20-pre-S (adr) or pIL20-pre-S (ayw).

14. (Previously presented) A yeast transformant comprising the recombinant vector of claim 9, wherein the transformant secretes the mutant pre-S into culture media.

15. (Previously presented) The yeast transformant according to claim 14, wherein the mutant pre-S has adjuvant effect, stimulating immunogenicity of HBV surface antigens.

16. (Currently amended) The yeast transformant according to claim 14, wherein the mutant pre-S has one or both asparagines of a wild-type pre-S at amino acid position 15 ~~or~~ and 123 replaced with any amino acid selected from the group consisting of alanine, arginine, cysteine, glutamine, glutamic acid, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, and valine.

17. (Previously presented) The yeast transformant according to claim 14, wherein the pIL20-pre-S is selected from the group consisting of pIL20-pre-S(m15), pIL20-pre-S(123m), and pIL20-pre-S(dm).

18. (Previously presented) The transformant according to claim 14, wherein the transformant is Saccharomyces cereviciae.

19. (Withdrawn) The transformanant according to claim 14, wherein the transformant is selected from the group consisting of *Saccharomyces cerevisiae* 2805/pIL20-pre-S (KCTC 0987BP) and Saccharomyces cerevisiae 2805/pIL20-pre-S (ayw) (KCTC 1004BP).

20. (Withdrawn) A recombinant pre-S produced from the transformant of claim 14.

21. (Withdrawn) The recombinant pre-S according to claim 20, wherein the recombinant pre-S is fully glycosylated, partially glycosylated, or not glycosylated.

22. (Withdrawn) The recombinant pre-S according to claim 20, wherein the recombinant pre-S is further treated with glycosidase.

23. (Withdrawn) An adjuvant comprising a pre-S of HBV.

24. (Withdrawn) The adjuvant according to claim 23, wherein the pre-S is not glycosylated or is partially glycosylated.

25. (Withdrawn) The adjuvant according to claim 23, wherein the pre-S is a mutant pre-S in which one or both asparagines of a wild-type pre-S at amino acid position 15 or 123 are replaced with any amino acid selected from the group consisting of alanine, arginine, cysteine, glutamine, glutamic acid, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, and valine.

26. (Withdrawn) The adjuvant according to claim 23, wherein the pre-S is selected from the group consisting of Pre-S-15m (SEQ ID NO:9), Pre-S-123m (SEQ ID NO:10), and Pre-S-dm (SEQ ID NO:11).

27. (Withdrawn) An HBV vaccine comprising a pre-S.

28. (Withdrawn) The HBV vaccine according to claim 27, wherein the HBV vaccine further comprises an S antigen of HBV.

29. (Withdrawn) The HBV vaccine according to claim 27, wherein the pre-S is the recombinant pre-S protein.

30. (Withdrawn) The HBV vaccine according to claim 27, wherein the pre-S is not glycosylated, is partially glycosylated, or is fully glycosylated.

31. (Withdrawn) The HBV vaccine according to claim 27, wherein the pre-S is a mutant pre-S in which one or both asparagines of a wild-type pre-S at amino acid position 15 or 123 are replaced with any amino acid selected from the group consisting of alanine, arginine, cysteine, glutamine, glutamic acid, glycine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, proline, serine, threonine, tryptophan, tyrosine, and valine.

32. (Withdrawn) The HBV vaccine according to claim 27, wherein the pre-S is from an HBV selected from the group consisting of adr, ayw, adw, adw2, and adyw subtypes.

33. (Withdrawn) The HBV vaccine according to claim 27, wherein the pre-S is selected from the group consisting of wild-type pre-S, Pre-S-15m (SEQ ID NO:9), Pre-S-123m (SEQ ID NO:10), and Pre-S-dm (SEQ ID NO:11).

34. (Withdrawn) A diagnostic composition for detecting antibodies against HBV, HBV surface antigens, or antigens coded by the pre-S gene, wherein the diagnostic composition comprises an HBV pre-S.

35. (Withdrawn) The diagnostic composition according to claim 34, wherein the pre-S is from an HBV selected from the group consisting of adr, ayw, adw, adw2, and adyw subtypes.

36. (Withdrawn) A producing method of an HBV pre-S, comprising:

(a) inserting the gene encoding pre-S into a vector;

(b) transfecting the vector harboring the pre-S gene to a host cell; and

(c) producing the pre-S by culturing a transformant in medium.

37. (Withdrawn) A method of enhancing an antibody response to an antigen, wherein the method comprising administering an antibody-enhancing effective amount of the adjuvant of claim 23 to a mammal or bird.

38. (Withdrawn) The method according to claim 37, wherein the antigen is derived from virus, bacteria, yeast, or fungi.

39. (Withdrawn) The method according to claim 38, wherein the virus is HIV, HBV, HCV, or rotavirus.

40. (Withdrawn) The method according to claim 37, wherein the mammal is selected from the group consisting of a human, a livestock animal, a laboratory test animal, a domestic animal, and a captive wild animal.

41. (Withdrawn) The method according to claim 37, wherein the bird is a chicken or other poultry bird.

42. (Withdrawn) A method of generating immunity for the hepatitis B virus, the method comprising administering the HBV vaccine of claim 27.

43. (Withdrawn) The method according to claim 42, further comprising administering a HBV S antigen.